



IRS Office of the Chief Procurement Officer

Data Science Fellowship Wrap-up

Lessons Learned

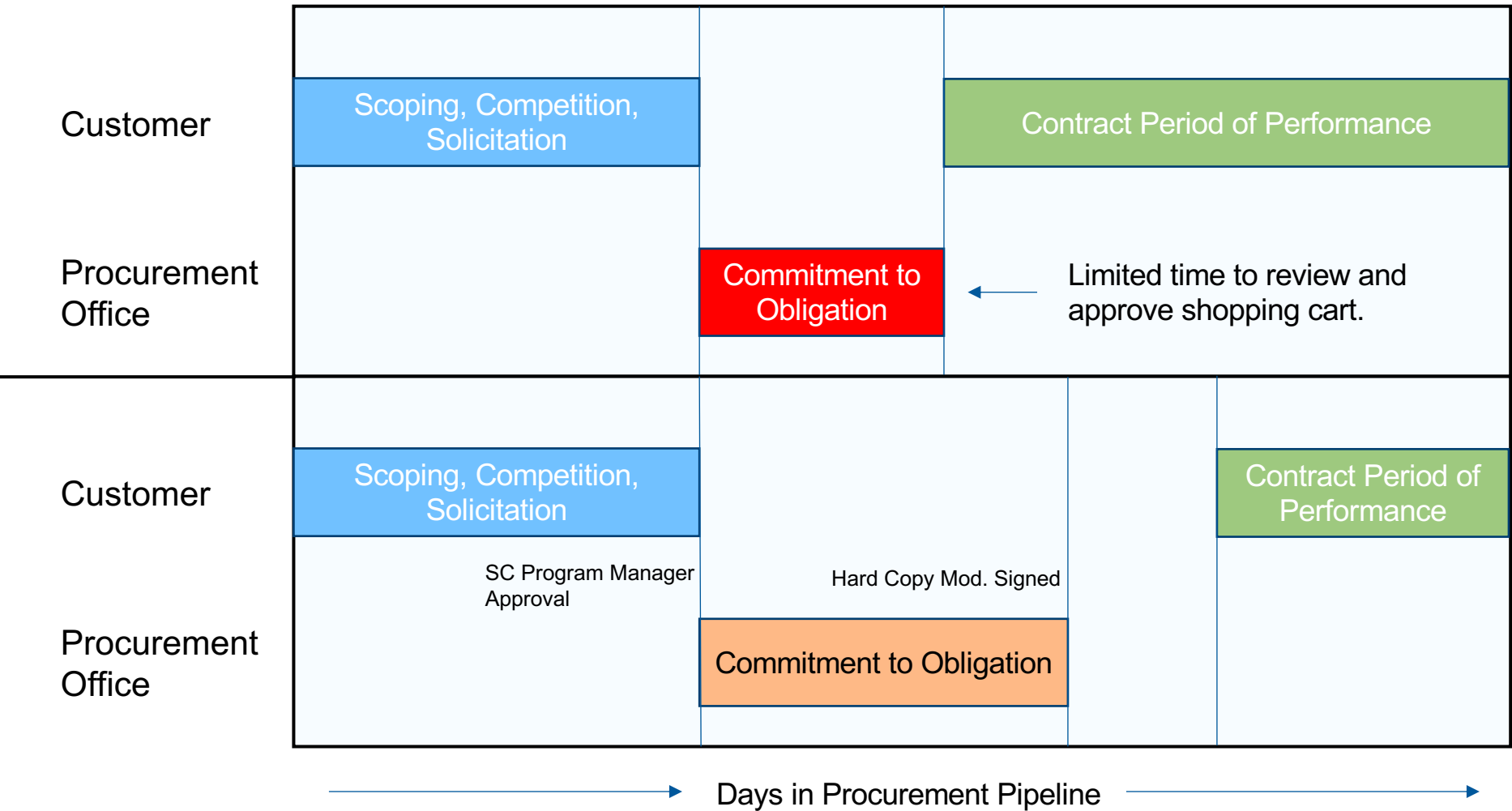


Learning About Procurement Through Tableau Work



Close Call Shopping Carts

Procurement Pipeline





First Set of Views: Close Call Shopping Carts

What is the focus?

We looked at shopping carts for which the commitment occurs a week or less before the obligation.

What are the goals?

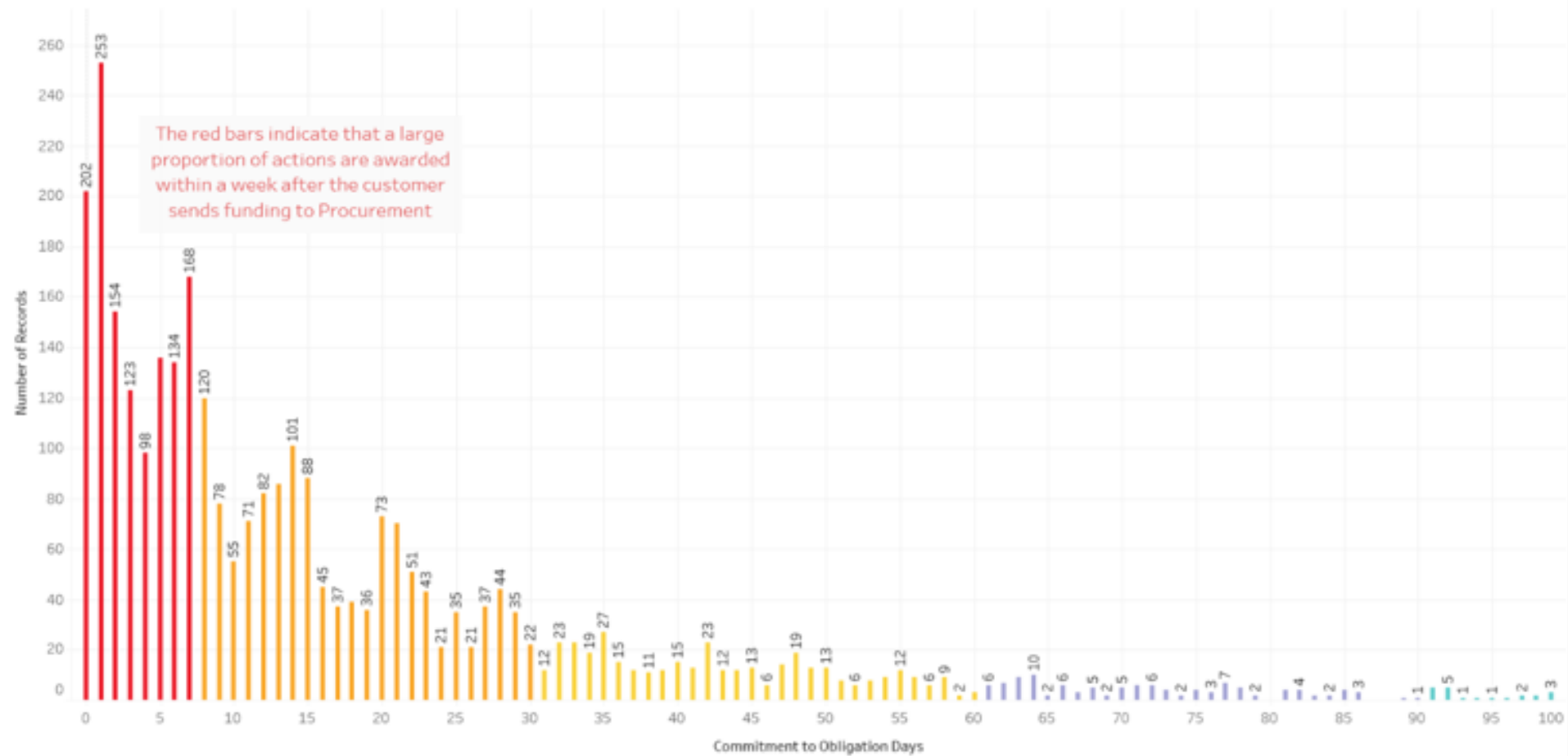
Evaluate whether Program Offices are committing work timely. More specifically, look for trends between the date committed and the date obligated.

Evaluate whether we are increasing our risk by allowing Program Offices to keep the funding under later in the fiscal year.



Close Call Shopping Carts Overall

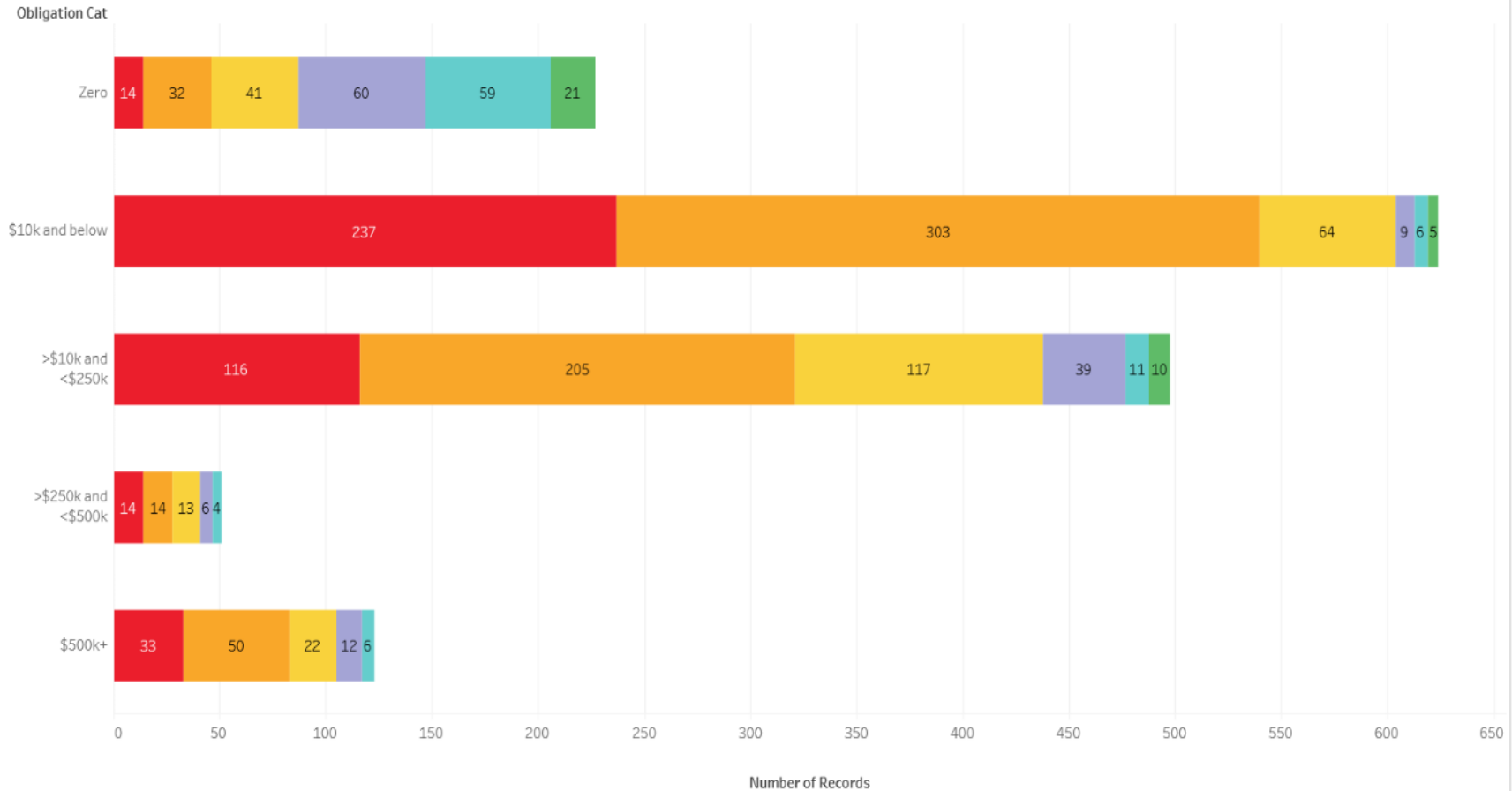
Counts for Commitment to Obligation Days





Close Call Shopping Carts Overall

Count of Shopping Carts by Obligation Amount Categories



Commitment to Obligati...

- ☒ (All)
- ☒ Between 31 and 60 ...
- ☒ Between 61 and 90 ...
- ☒ Between 91 and 120...
- ☒ Over 120 Days
- ☒ Under 8 Days
- ☒ Under 31 Days

Obligated

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Commitment to Obligati...

- ☐ Over 120 Days
- ☐ Between 91 and 120 ...
- ☐ Between 61 and 90 D...
- ☐ Between 31 and 60 D...
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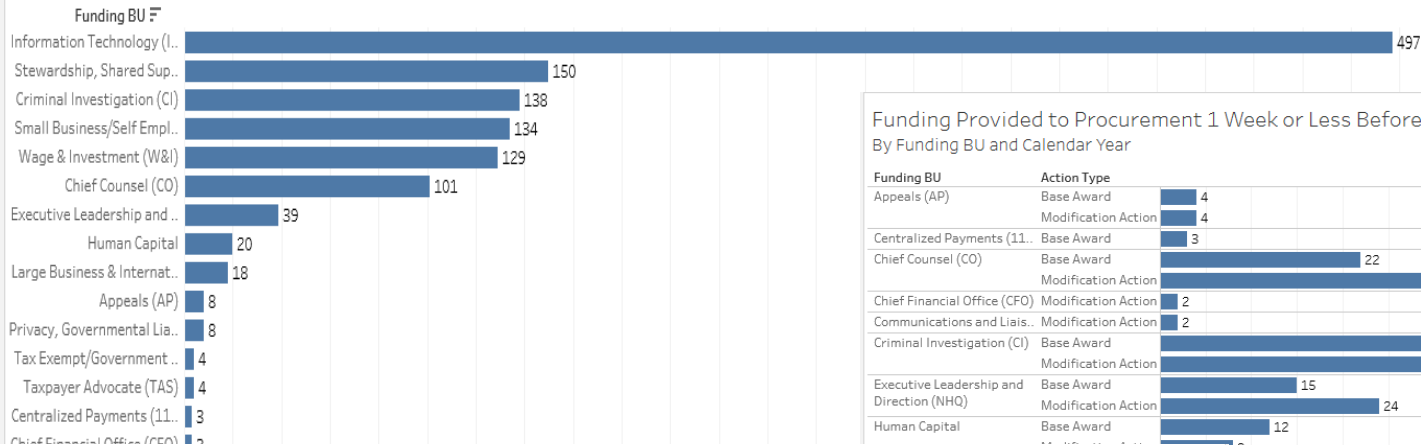
Action Type

- ☐ (All)
- ☒ Base Award
- ☐ Modification Action

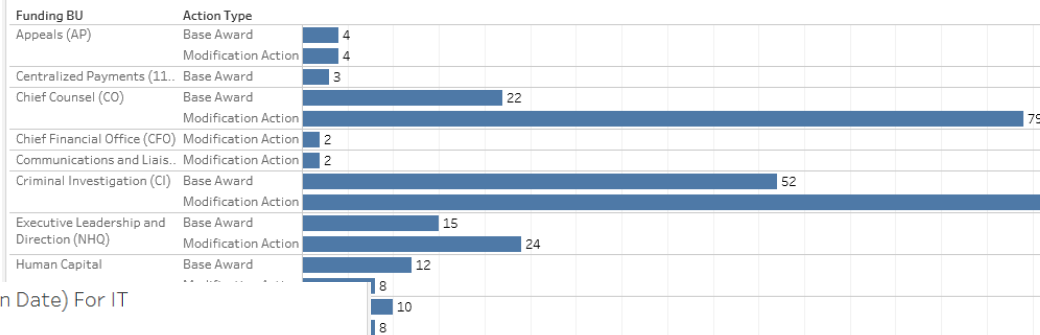


Close Call Shopping Carts Overall

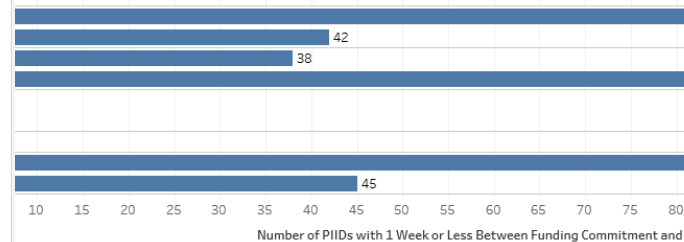
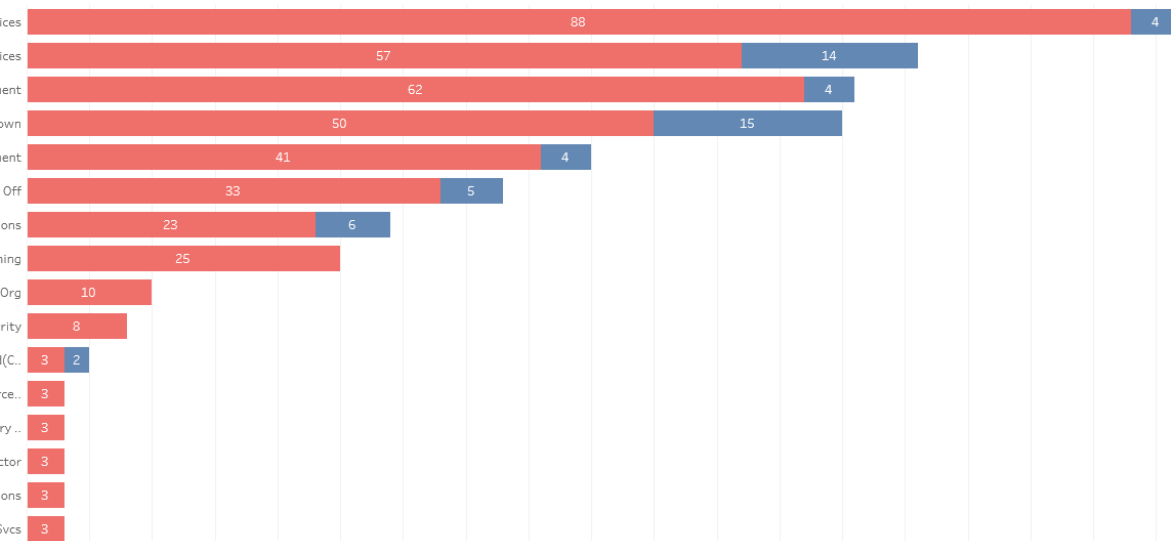
Funding Provided to Procurement 1 Week or Less Before Contract Award (Commitment Date. Vs Obligation Date)
By Funding BU for FY 2020



Funding Provided to Procurement 1 Week or Less Before Contract Award (Commitment Date. Vs Obligation Date)
By Funding BU and Calendar Year



Funding Provided to Procurement 1 Week or Less Before Contract Award (Commitment Date. Vs Obligation Date) For IT
By Action Type (FY20)



Number of PIIDs with 1 Week or Less Between Funding Commitment and



Close Call Shopping Carts Overall

Box Plot for Commitment to Obligation Days by IT COR Office



Number of Offers Received on Close Call Contracts by Funding BU

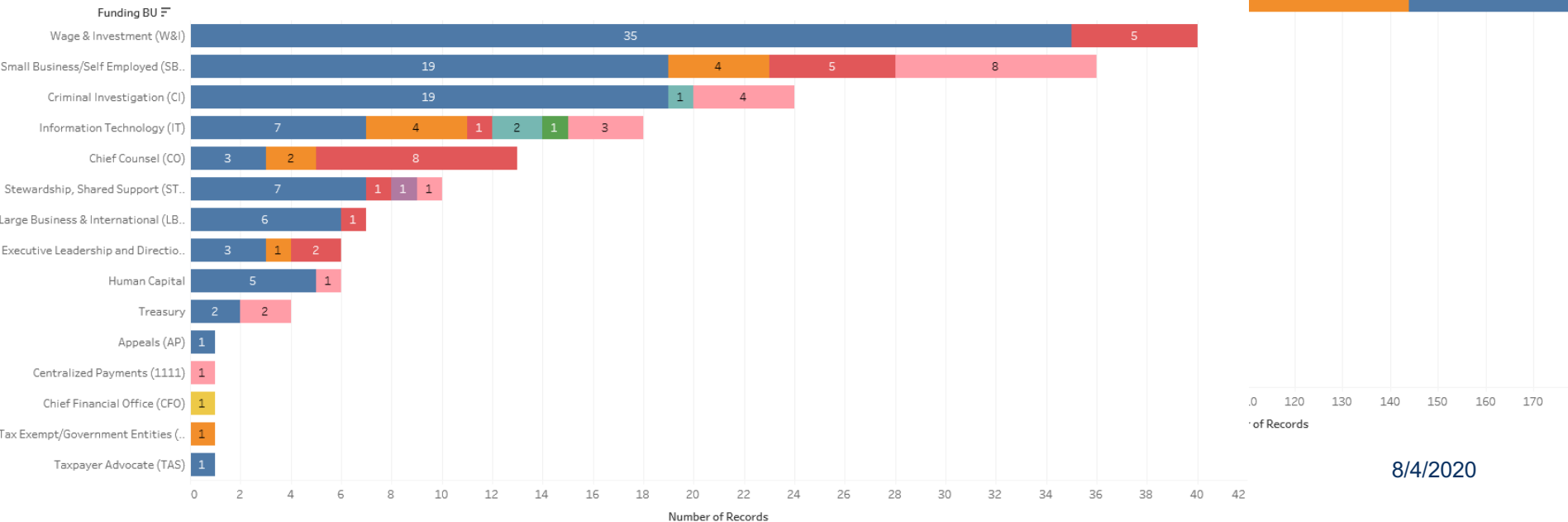




Tableau / Visualizations Takeaways

- Reach out to experts to define motivations of your project
- Start at the top, people's brains don't work backwards
- Two simple graphs and a slow walkthrough are better than one mess and a confused stakeholder
- Documentation and note taking is a constant process
 - Always ask for feedback
- You're not too smart to ask questions



Moving on to Models

Close Call Follow Up Question :

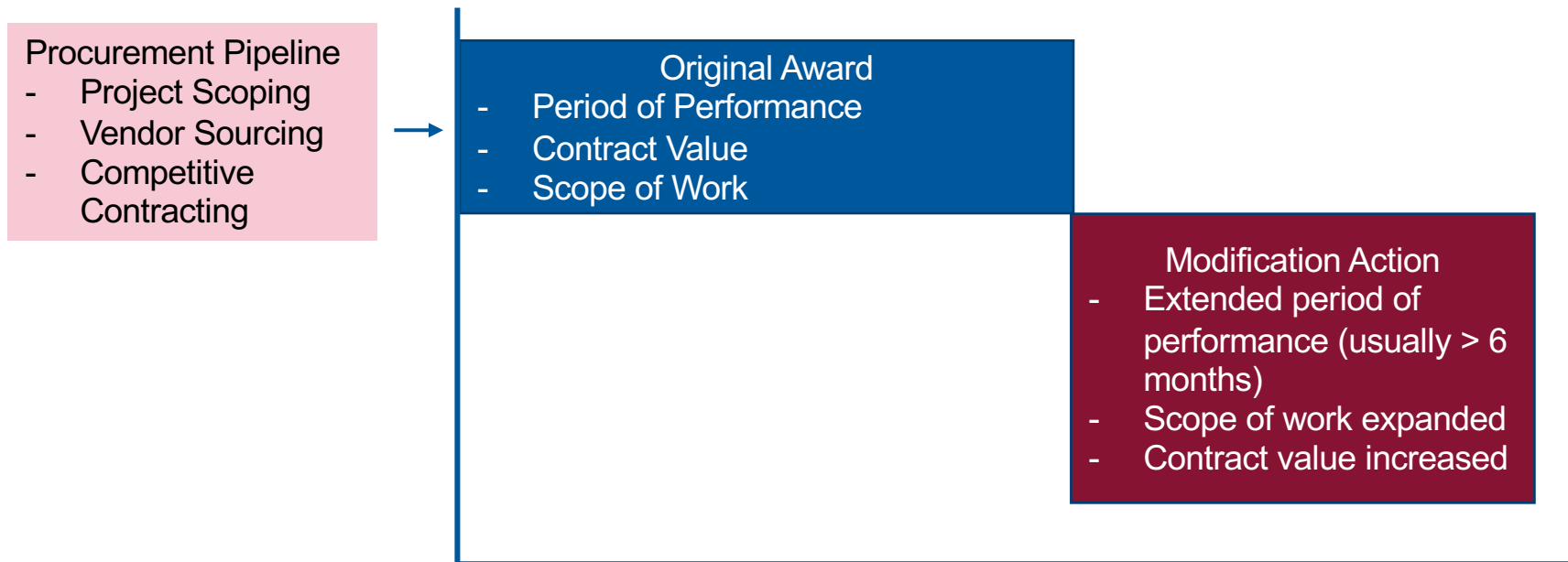
Bridge Contracts. What percentage of close calls resulted in bridge contracts?
(Note: we may limited data on bridge contracts. Some COs may label these in the description)



Bridge Modifications

An extension to an existing contract beyond the period of performance
(following exercise of all options meeting the requirements of FAR 17.207)

Example:



But we still cannot know which modification actions are bridge mods.



Bridge Modifications

Original
Award

Modification
Action

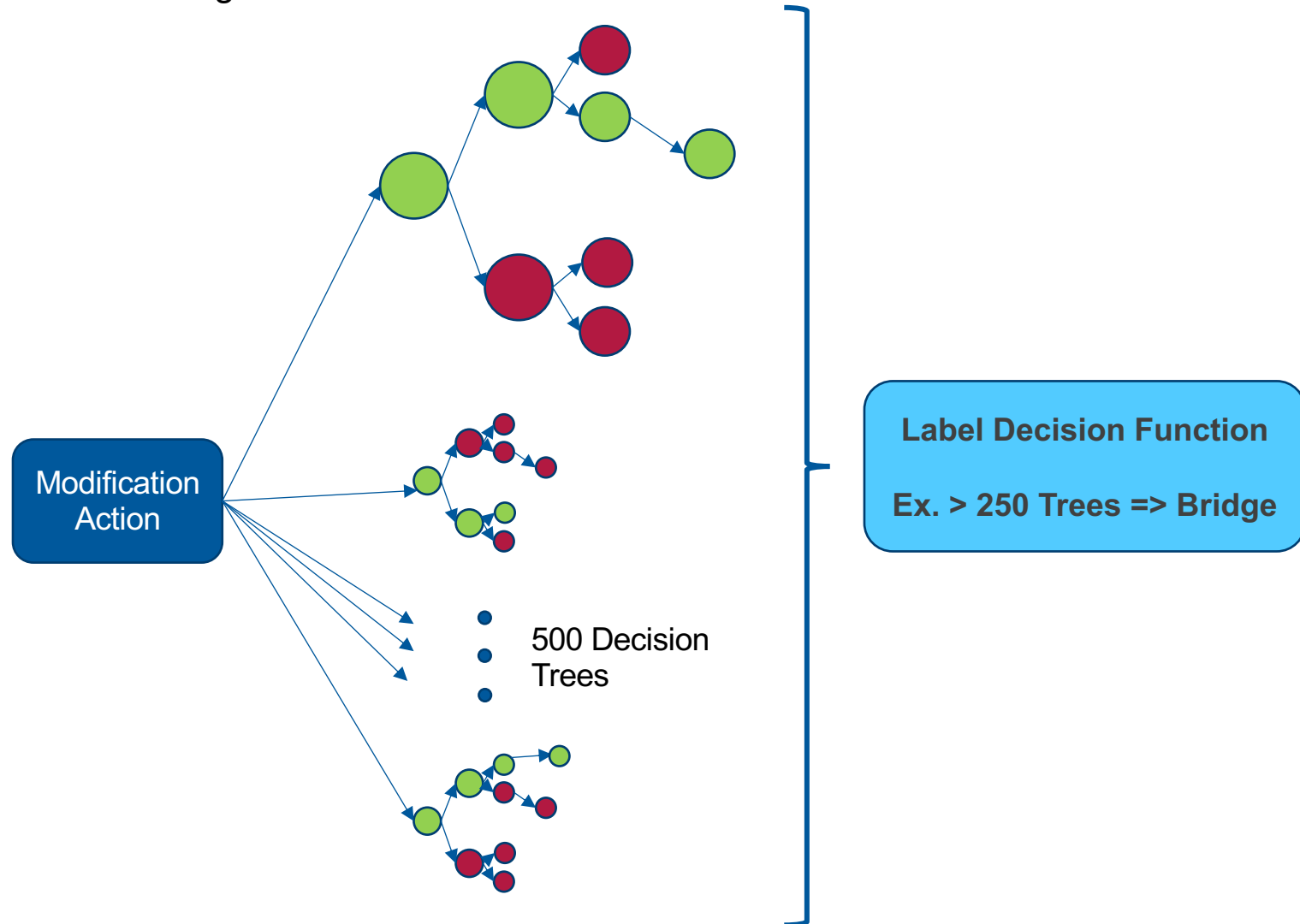
An extension to an existing contract beyond the period of performance
(following exercise of all options meeting the requirements of FAR 17.207)

Award ID	Description	End Date	Days Extended	Value	Raised Value?	Total Raise in Value	Contract Length	Is a Bridge?
0001-101	Translation Services	01-30-2020	N/A	\$1000	N/A	\$0	365 Days	N/A
0001-101	Translation Services	01-30-2020	0	\$2500	True	\$1500	365 Days	False
0001-101	Translation Services	05-30-2020	123 Days	\$5000	True	\$2500	488 Days	True
2002-202	Construction Services	02-01-2020	N/A	\$100,000	N/A	\$0	100 Days	N/A
2002-202	Construction Services	08-05-2020	186 Days	\$350,000	True	\$250,000	286 Days	False

- No labelled data
- No easy “catch-all” solution
- Data elements for exercise of options are missing in USASpending

Bridge Modifications

Training a Random Forest Model

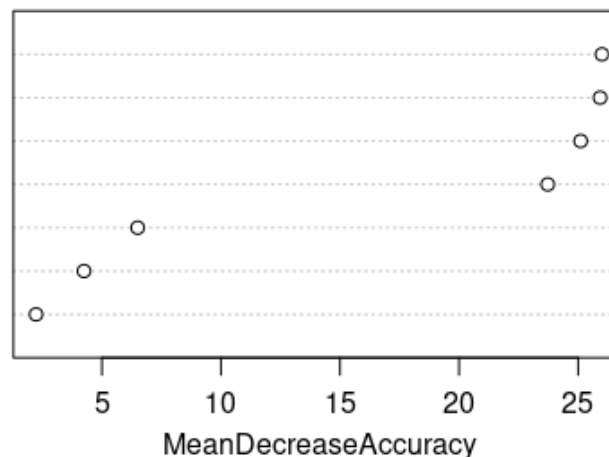




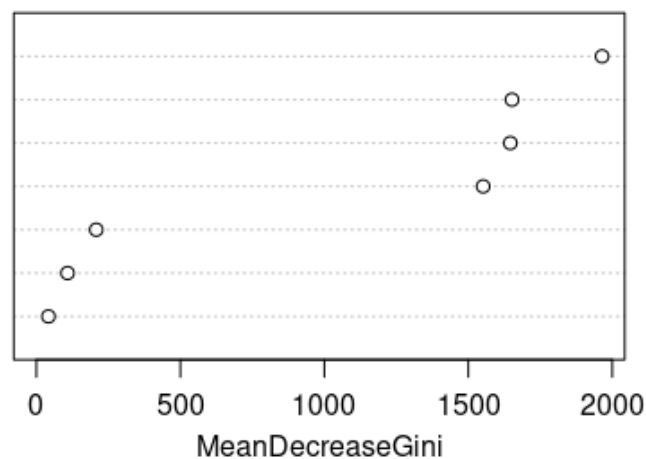
Bridge Modifications

Random Forest Feature Importance

extension_beyond_original_contract_end
base_and_all_options_value
value_raised
extended_beyond_6_months
total_raise_in_value
contract_length
affecting_action_type



base_and_all_options_value
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Bridge Contracts

New, interim sole-source contract awarded to the same or a new contractor to cover the timeframe between the end of the existing contract and the award of a follow-on contract

Example:

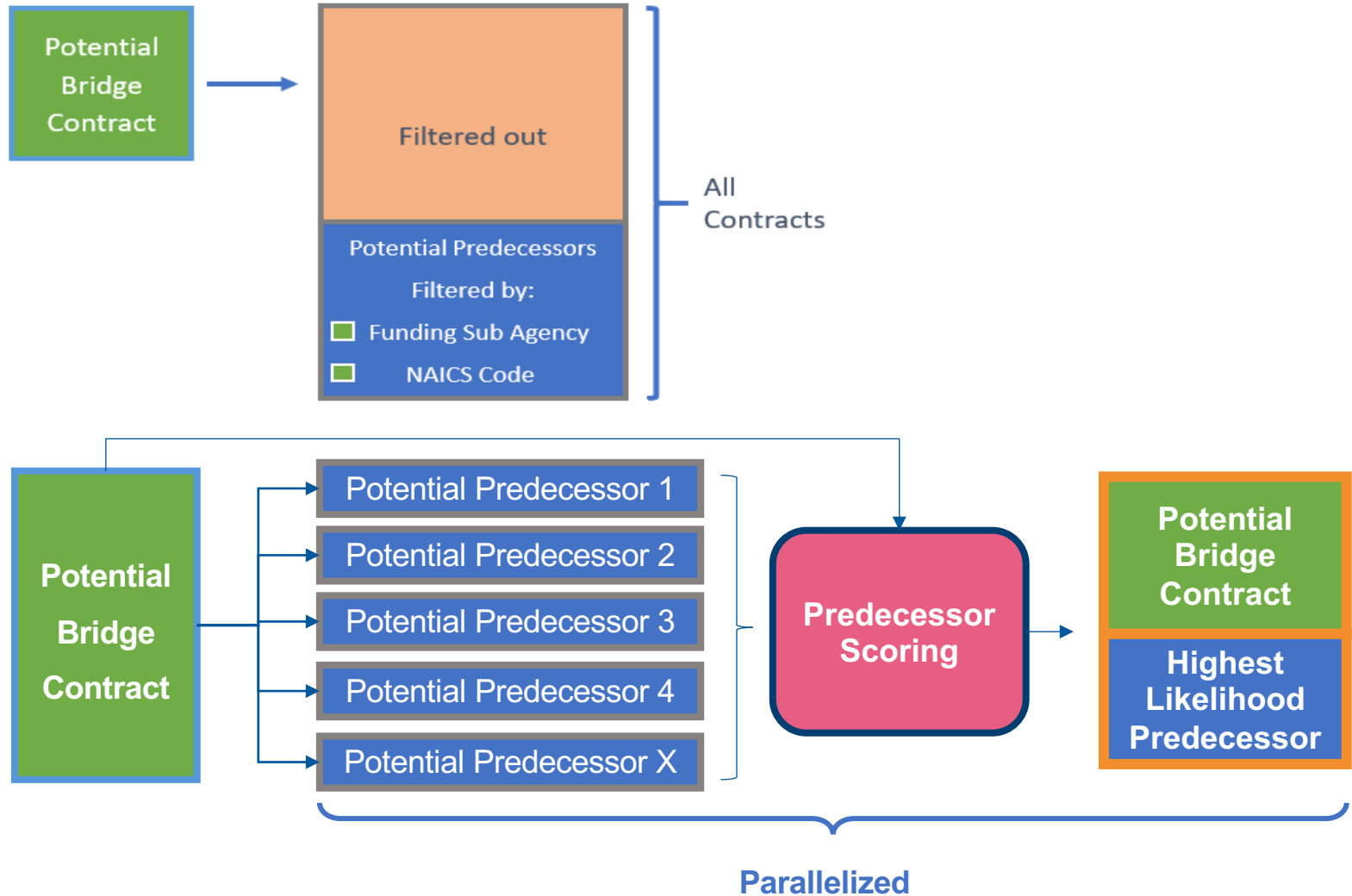
Expiring
Contract

- Same or Different Vendor as Expiring Contract
- Immediately Following Expiring Contract
- Limited Sourcing
- Similar Award Description
- Same Funding Agency + NAICS code

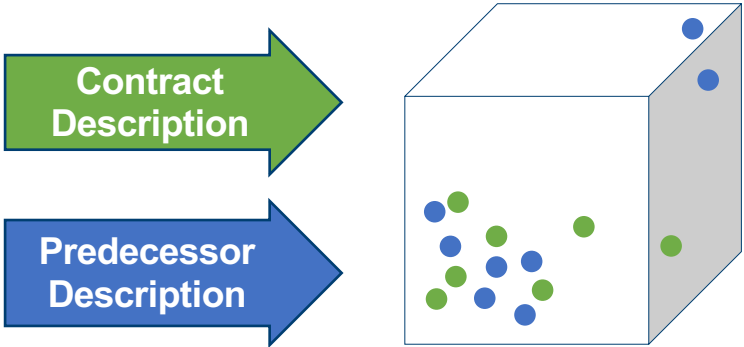


Follow On
Contract

Bridge Contracts

Predecessor Analysis



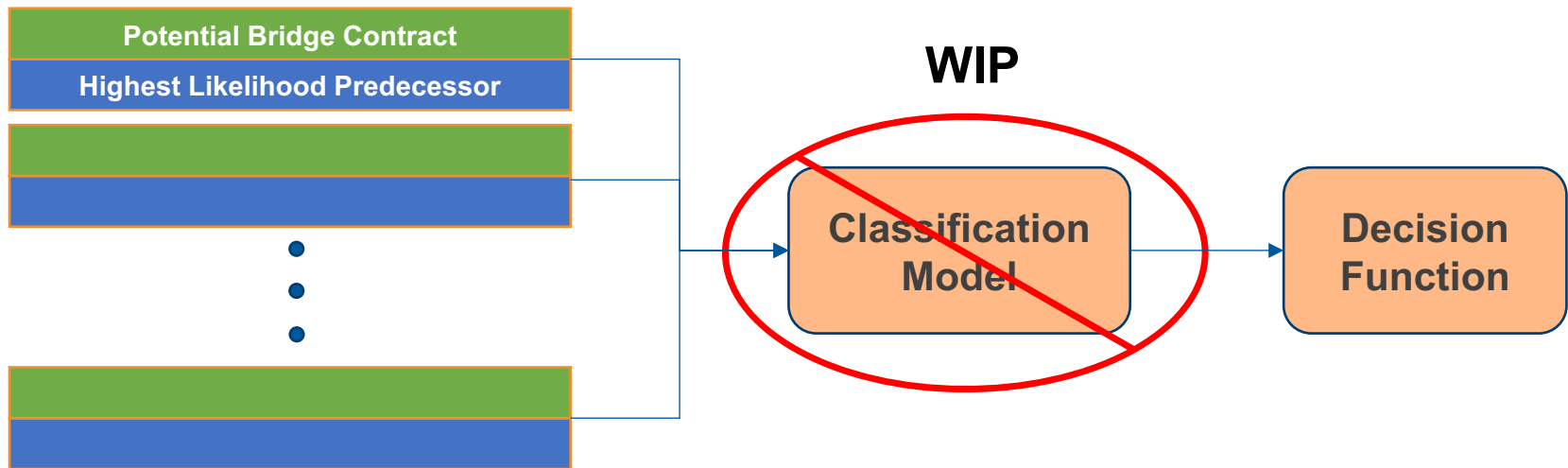
Predecessor Scoring

Method	Output
	Cosine Description Similarity $\text{similarity}(doc_1, doc_2) = \cos(\theta) = \frac{doc_1 doc_2}{ doc_1 doc_2 }$
	Period of Performance Gap
	Same Vendor Boolean

Predecessor Score

$$= \text{Cosine Description Similarity} + \{\text{Same Vendor? } 1:0\} + (1 - \frac{PoP \text{ Gap}}{7})$$

Bridge Contracts Modelling



Still need:

- Predecessor Labels
- Bridge Contract Labels



Bridge Modifications and Contracts

Takeaways

- Solve sub problems first, build tools for future work
- If you don't have labelled data, that's okay
- Be clear when communicating your project and work
- Documentation should be continuous, don't wait until the end
- Don't hijack Mercury to parallelize just because you're impatient



Questions?